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SOVIET REPORT ON INTERNATIONAL CONGRESS OF PHYSIOLOGY HELD IN MONTREAL IN SEPTEMBER 1953

[Comment: The following report, written by Professor L. Voronin, gives a Soviet evaluation of physiological research outside the USSR and also lists reports given at the congress by Soviet delegates.]

The 19th International Congress of Physiology recently [September 1953] was held in Montreal. A delegation of Soviet scientists took part in the work of this congress.

A total of 715 scientific reports were presented at the congress. These reports covered almost all subdivisions of physiology, many problems in pathophysiology, and also problems in biochemistry and pharmacology. Only seven reports by foreign scientists dealt with problems of the physiology of higher nervous activity. This proves that the most important subdivision of physiology is being investigated very little in the Western world. Only three of these seven reports were of definite interest, although they gave no new data to our physiologists. These reports stand out mainly because they show the tendency of individual foreign scientists to use in their research the method of conditioned reflexes and to explain facts on the basis of the fundamental postulates of the physiological teaching of I. P. Pavlov.

In this connection, one should note the communications by F. Morrell of New York and W. H. Gantt of Baltimore. By combining the method of conditioned reflexes with electroencephalography, Morrell established the different nature of the fluctuations of electric potentials in inner as compared with external inhibitions, as well as variations of these fluctuations in inner inhibitions, namely, differentiating, fading, and delayed types of inhibition.

Gantt reported on the results of his original investigations carried out by using the method of conditioned reflexes. He investigated salivary, gastric, biliary, vestibular, and other conditioned reflexes, arriving at the result which is already known to us, i.e., that conditioned reflexes may be obtained which affect all organs.

By comparing motor and secretory conditioned reflexes produced by external irritants with conditioned reflexes originating from internal analysors (the reflexes which he referred to as visceral conditioned reflexes), Gantt found that the reactivity involved in the second type of reflexes (visceral reflexes) is less adaptive and less labile than that involved in the other reflexes mentioned.

The facts which Gantt reported are already known to Soviet physiologists. Furthermore, his explanations, in a number of cases, correspond to the postulates of Pavlov's teachings. However, Gantt's assertion that in a healthy animal the emotional state (motivation) is an important factor in the origination of conditioned reflexes causes astonishment. Apparently Gantt, although in perfect command of the Pavlovian method of investigation, is nevertheless not free from the influence of American idealistic psychology and psychosomatics.

Other reports which, on the basis of the subject matter with which they deal, could be classified as relevant to the physiology of higher nervous activity, represented frank zoo-psychological fabrications.

J. Z. Young of London, in a report entitled "The Learning System of the Octopus," cited data on the nutritional and protective conditioned reflexes of the octopus both under normal conditions and after destruction of parts of the nervous system. The attempt to find a connection between the behavior of the animal and the morphological basis of this behavior is, of course, of great interest. However, the method of investigation used by Young was plainly inadequate, while Young's explanations had an anthropomorphic character. For instance, he talked about the impressions, memory, and system of perception of the octopus.

Of considerable interest was a report by the Polish delegate, W. Missiuro, Professor at Warsaw University. By studying the fatigue which develops in the muscles of the human finger under various conditions (when the subject works alone and as a member of a group; under the action of various irritants and without their action), Missiuro collected convincing data which show that there is a positive effect of the cerebral cortex in delaying the development of fatigue.

All reports given by the Soviet delegates dealt with problems of the physiology of higher nervous activity. Academician K. M. Bykov presented a report giving new data on the physiology and pathology of the cerebral cortex. Academician V. A. Engel'gardt reported on the phosphoprotein metabolism of the brain. Prof D. A. Biryukov presented new data showing that when the conditioned reflex activity of the organism is disturbed, vegetative changes take place. These changes are less pronounced when the phylogenetic development of the animal is higher.

Prof L. Voronin presented new data on the mobility of processes of excitation and inhibition in a number of vertebrates (fishes, turtles, birds, rabbits, dogs, and lower and higher apes or monkeys). It was shown that the higher the phylogenetic development of the animal, the more highly developed is the mobility of nervous processes and the longer are traces of irritation preserved in the highest subdivision of the nervous system.

N. I. Kasatkin discussed the dynamics of the formation of conditioned reflexes in young children. I. T. Kurtsin told about the basic principles of corticovisceral physiology and pathology. These principles are important for the understanding of such diseases as gastrointestinal ulcers, hypertension, and neuroses of the heart, blood vessels, intestine, and other internal organs. Prof M. V. Sergiyevskiy gave a report on the cortical regulation of respiration. The results of experimental work conducted at his laboratory show that the cortex participates in the function of respiration.

Other members of the Soviet delegation, V. S. Rusinov and G. D. Smirnov, presented new data dealing with the analysis of bioelectric phenomena which take place in the cerebral cortex when a dominant focus of excitation is present. They also discussed the mobility of nerve processes in the central and peripheral sections of the optical analysor when a brief or prolonged action of an irritant formed by a source of light has taken place.

The participants in the congress were shown Soviet popular scientific and brief scientific films. These films included "The Cerebral Cortex and the Functions of the Organism," "The Methods of Comparative Physiological Investigation of the Higher Nervous Activity," and "Experimental Sleep in Monkeys or Apes." The interest which these motion pictures elicited was so great that the showing was repeated twice on the days following the original exhibition. This was done at the request of the delegates to the congress.

Many laboratories which we inspected on our trip are equipped with good, modern apparatuses, mainly for electrophysiological investigations. The electroencephalographic technique is used by physicians not only in experiments but also in medical practice. This technique is applied successfully by Penfield, famous Canadian neurologist and neurosurgeon. Penfield uses electroencephalography not only for diagnosis but also during surgical operations. After the brain of the patient has been exposed, Penfield, with the aid of electroencephalography, determines the outline and the depth of the affliction of the brain. Then, as the focus of the affliction is gradually eliminated by surgery, he determines by the same method whether the pathologically altered brain tissue has been removed completely.

In conclusion, one must say that a number of factual data which are based on foreign work and relate to the functioning of the brain, and also some individual methods of investigation and techniques applied in this field outside the USSR are worthy of attention and can be used by us in practical work. However, foreign researchers, generally speaking, are still on the level of analytical physiology, which precedes Pavlov.

Although the methods of investigation used by foreign physiologists are technically far advanced, these methods merely permit a more precise determination of facts which are already known and the discovery of individual, detached phenomena. These methods cannot yield important and general results. In them lie the limitations of bourgeois science. The more progressive foreign scientists feel that these limitations exist. For that reason, they pay great attention to developments in Soviet physiology. For the same reason, the tendency exists among them to discuss problems connected with the [joint] planning and interdependence of physiological investigations carried out in various countries.

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